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CONTROL OF BULB PESTS

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During the 1940, 1941, and 1942 seasons studies have been conducted in an experimental and semi-commercial way to ascertain the most effective schedules and the limitations of methyl bromide for use in controlling pests in bulbs of various kinds. It has been found that the most important insect pests in all varieties of bulbs tested can be controlled with little or no injury and no marked harmful growth reactions in the bulbs whether they be field grown or forced.

Properties of methyl bromide. Methyl bromide is a colorless, odorless, poisonous liquid which boils at 40.1° F. Under ordinary temperature conditions it is an odorless, colorless gas. It is sold under pressure in one-pound cans, and in ten, fifty, and one hundred fifty-pound cylinders.

Precautions in use of methyl bromide. Because of its odorless and colorless nature, great care must be exercised in the use of methyl bromide. Several fatalities have resulted because of laxity in its use. Chambers in which methyl bromide has been used should never be entered before they are properly aired out. The required length of time to evacuate the gas from a given chamber should first be determined by means of a halide leak detector, and under no circumstances should anyone enter such chamber before the predetermined evacuation time has elapsed.

All operators using methyl bromide should be equipped with an approved gas mask for use against organic vapors.

Care should be exercised not to allow liquid methyl bromide to come in contact with the skin as it may cause severe skin injury.

Directions for use of methyl bromide. When fumigating with methyl bromide, it is necessary that adequate circulation be provided in the chamber throughout the entire exposure period. A circulating fan should be mounted where it will keep the air in continuous movement. Several instances of severe injury to narcissus bulbs have resulted by not following this precaution.

At any given dosage, certain temperature ranges must be maintained. As a general rule, less methyl bromide is necessary to produce a given result at higher temperatures than at any given lower temperatures.

The dosages and exposure periods in this circular have been worked out for a given temperature; however, if this temperature cannot be maintained, the dosage and exposure period may be adjusted to suit the need.

The United States Department of Agriculture, Bureau of Entomology and Plant Quarantine, Division of Control Investigations, issued the following information on September 15, 1942. They state that one-half hour exposure equals one-half pound of methyl bromide equals 10° F. temperature.

For example, if a certain schedule called for three pounds methyl bromide per one thousand cubic feet for four hours at 70° F., and the prevailing temperature at the time of fumigation was 60° F., a dosage of three and one-half pounds per one thousand cubic feet could be used for four hours, or a dosage of three pounds could be used for four and one-half hours. With this formula, the dosage and exposure can be adjusted to the temperature condition prevailing; but it is suggested that the recommended schedules be adhered to wherever possible.

Fumigation of narcissus bulbs. The recommended schedule for the control of the greater and lesser bulb flies and the Tarsonemus mite is three pounds of methyl bromide per one thousand cubic feet for four hours at 70° F. This schedule has given consistent control of the above pests with no injury to the bulbs.

Narcissus bulbs need not be cured when methyl bromide is used. Many field-grown and certain forced King Alfred bulbs have all performed equally well whether cured or not before being fumigated.

There have been no marked differences in blooming dates of experimentally fumigated and unfumigated bulbs, except that fly-injured King Alfred bulbs bloom earlier when fumigated than do unfumigated injured or uninjured bulbs. Forcing tests of methyl bromide fumigated King Alfred, Silver Star, Croesus, and Laurens Koster have shown that they perform as well as unfumigated bulbs.

The following varieties of narcissus have been tested in field trials and have been found to be tolerant to methyl bromide fumigation (no varieties tested have shown any ill effects):

1. Aerolite
2. Agnes Harvey
3. Aspasia
4. Barnardino
5. Barrii conspicuous
6. Bathe's Flame
7. Buttercup Jonquilla
8. Croesus
9. Diana Kasner
10. Double Campernelle Rugulosus
11. Duke of Malbourgh
12. Elvira Poetaz
13. Emperor
14. Gloria Sassenheim
15. Golden Sceptre
16. Great Worley
17. Helios
18. Jacoba White Trumpet
19. Jonquilla simplex
20. King Alfred
21. Lady Moore
22. Laurens Koster
23. Lord Kitchner
24. Lucifer
25. Lucreace Poetaz
26. Madam DeGraff
27. Masterpiece
28. Mrs. Asquith
29. Mrs. Barkley
30. Nanny Nunn
31. O. maximus poeticus
32. Olympia
33. Pheasant eye
34. Poeticus Laureate
35. Silver Star
36. Sir Watkin
37. Spring Glory
38. Sunrise barrii
39. Torch
40. Tresserve
41. Van Wavern Giant
42. Vesta
43. Victoria
44. Village Beauty
45. Von Sion
46. White Pearl
47. Whitewell

Fumigation of narcissus bulbs in refrigerator cars has proved satisfactory when a fan is located in each ice bunker to provide circulation over the load of bulbs for the entire period of exposure. The bunker lids may be sealed with wet paper and flour paste, the bunker drains with wet paper, and the doors with flour paste. Cars sealed in this way have given satisfactory pest control with no harmful effect on the bulbs. Before entering fumigated cars for removal of fans and other equipment, a halide leak detector should be used to test for the presence of methyl bromide.

Fumigation of lily bulbs. Various varieties and crosses of lilies have been fumigated at dosages of two pounds for two, three, and four hours at 70° F., and at three pounds for four hours at 70° F. All these schedules, in experimental trials, have given 100% control of the lily thrips without injury to the bulbs. Experimentally fumigated commercial Madonna and Easter lilies apparently have been uninjured in field trials. Croft Easter lilies have been fumigated and forced, with the bulbs performing as well as unfumigated bulbs in one year's trials.

For lesser bulb fly control, a schedule of three pounds of methyl bromide per one thousand cubic feet for four hours at 70° F. is suggested.

For lily thrips control only, suggest a schedule of two pounds of methyl bromide per one thousand cubic feet for three hours at 70° F.

Fumigation of miscellaneous bulbs: The following bulbs have been fumigated and found tolerant to methyl bromide fumigation at a dosage of three pounds per one thousand cubic feet for four hours at 70° F.

1. Blue Hyacinth (Mysotis)
2. Pink Hyacinth (Gurtrude)
3. Wedgewood Iris
4. Mixed tulip varieties (all varieties in the mixed lot seemed to perform as well as untreated bulbs)
5. Snow Drop
6. Yellow Crocus
7. Purple Crocus (untreated lot bloomed about one week prior to fumigated lot)
8. Grape Hyacinth (muscari)
9. Blue Scilla

SUMMARY

1. Methyl bromide used at a schedule of three pounds per one thousand cubic feet for four hours at 70° F. has been found to be effective in the control of greater bulb flies, Tarsonemus mite in narcissus bulbs, and lily thrips in lily bulbs.

2. Methyl bromide used at the above dosage has been found not to injure most varieties of bulbs treated.

3. Uncured King Alfred narcissus bulbs perform as well in growth on being fumigated with methyl bromide as do cured bulbs.
